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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,794	12/29/2005	Masayuki Ono	043887-0181	4041

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EXAMINER	
GUHARAY, KARABI	
ART UNIT	**PAPER NUMBER**
2889	

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11/15/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/562,794	ONO ET AL.	
	Examiner	Art Unit	
	Karabi Guharay	2889	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *RCE, filed on 10/6/10*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,6-10,13,14,16-21 and 23-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,6-10,13,14,16-21 and 23-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/6/2010 has been entered.

Response to Amendment

Amendment, filed on 9/14/2010 has been considered and entered. Claims 1, 9 and 23 are amended. Claims 5, 12 are cancelled.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3, 6-10, 13-14, 16-17 & 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bertram et al. (US 2003/0042850).

Regarding claims 1, 9, 16-17, Bertram et al. disclose a phosphor element (see Fig 1) comprising an electron hole injection electrode (2) and an electron injection electrode (4) disposed opposite to each other; an electron hole transport layer (layer 2 comprises two layers one hole injecting layer and one hole transporting layer: paragraph 20), a phosphor layer (light emitting layer 3 formed of inorganic material; paragraph 21) and an electron transport layer (layer 4 comprises two layers one electron injecting layer and one electron transporting layer;

paragraphs 30-33) stacked in this order from the side of the electron hole injection electrode toward the side of the electron injection electrode, wherein the stacked layers are sandwiched between the electron hole injection electrode and the electron injection electrode, and wherein the phosphor layer includes an inorganic phosphor particle (quantum dots comprising Group II-VI semiconductor compound) in which at least one part of a surface of the inorganic phosphor layer (3) is covered with a conductive organic material (paragraph 23, 25, 26 & 29), and wherein the inorganic phosphor layer emits directly in response to applied electric field between the electron hole injection electrode and the electron injection electrode (paragraph 36), inorganic phosphor layer comprises a fluorescent substance including semiconductor host crystal (see paragraph 21) though Bertram et al. do not explicitly mention semiconductor host material including oxides of one kind selected from a group Zn Ga In Sn and Ti , however Group II-VI semiconductor compounds includes oxides of Zn and In, thus it would have been obvious to one having ordinary skill in the art to use oxides of Zn and IN, since selection of one of the known materials for known purposes are within the skill of art.

Further, though Bertram et al. fail to explicitly disclose that the organic material is chemically adsorbed to at least one part of the surface of the inorganic phosphor layer, it is inherent that attachment of linking moiety to the quantum dot is through covalent bonding, in other words linking means through chemical bonding. (See Bawendi et al. US 2001/0040232)

Regarding claim 3 & 10, Bertram et al. disclose the phosphor element according to claims 2 & 9, further comprising first and second substrates disposed opposite to each other in which at least one of the first and second substrates is transparent or semi-transparent, wherein the electron hole injection electrode, the electron hole transport layer, the phosphor layer, the electron

transport layer, and the electron injection electrode are sandwiched in this order between the first and second substrates (paragraph 32).

Regarding claims 6, Bertram et al. disclose the phosphor element according to claim 5, wherein the organic material is a conductive organic material having an electron hole transporting property and chemically adsorbed to the surface of the inorganic phosphor layer disposed opposite to the electron hole transport layer (paragraphs 23).

Regarding claims 7, Bertram et al. disclose the phosphor element according to claim 5, wherein the organic material is a conductive organic material having an electron transporting property and chemically adsorbed to the surface of the inorganic phosphor layer disposed opposite to the electron transport layer (paragraph 24).

Regarding claims 8, 13-14, Bertram et al. disclose the phosphor element according to claims 5 & 12, wherein the organic material includes a conductive organic material having an electron hole transporting property and a conductive organic material having an electron transporting property, wherein the conductive organic material having the electron hole transporting property is chemically adsorbed to the surface of the inorganic phosphor layer disposed opposite to the electron hole transport layer, wherein the conductive organic material having the electron transporting property is chemically adsorbed to the surface of the inorganic phosphor layer disposed opposite to the electron transport layer (paragraphs 23 & 24).

Regarding claims 24-25, Bertram et al. disclose that the organic capping materials does not emit in response to applied electric field (paragraph 36).

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bertram et al. as applied to claim l above, and further in view of Watanabe et al. (US 2002/0015859).

Regarding claim 18, Bertram et al. disclose all the limitations of claim 18, except for an electron hole blocking layer sandwiched between the phosphor layer and the electron transport layer.

However, in the same field of organic EL device, Watanabe et al. teach an electron hole blocking layer sandwiched between the luminescent layer and the electron transport layer (see Abstract). Watanabe et al. further teach that such hole-blocking layer improves driving stability and low power consumption nature by limiting migration of holes from the light emitting layer (Paragraph 10).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide an electron hole blocking layer sandwiched between the luminescent layer and the electron transport layer, as taught by Watanabe et al. in the device of Bertram et al. since such layer will improve driving stability and low power consumption nature by limiting migration of holes from the light emitting layer.

Claims 19-21, 23 & 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bertram et al. (US 2003/0042850), in view of Koyama (US 2004/0207578).

Regarding claims 19-21 & 23, Bertram et al. discloses all the limitations of claims 19-21, & 23 (see rejection of claim 1, & 9) except for a thin film transistor which is an organic TFT, connected to either electron hole injection electrode or electron injection electrode and a plurality of X-electrodes extending parallel to each other in a first direction and a plurality of Y electrodes extending parallel to each other extending in a second direction perpendicular to first direction wherein the TFTs are connected to X and Y electrode.

Bertram discloses a plurality of EL displays arranged to form various display (paragraph 2) however, silent about the mode of driving the matrix display.

However, Koyama discloses an active matrix organic display device (Fig 5) having plurality of pixels wherein TFTs which is an organic TFT (paragraph 104) are connected to either electron hole injection electrode (anode) or electron injection electrode (cathode) and a plurality of X-electrodes (1501-1504 of Fig 15) extending parallel to each other in a first direction and a plurality of Y electrodes extending parallel to each other (1505) extending in a second direction perpendicular to first direction wherein the TFT (1506) is connected to X and Y electrode (paragraph 100). Koyama further teaches that having active elements like TFT to drive the display device provides longer light emission time and reduced powder consumption (see Abstract).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have active matrix display as taught by Koyama, in the device of Bertram et al. since such driving method provides longer light emission time and also reduces the consumption of power.

Regarding claim 26, Bertram et al. disclose that the organic capping materials does not emit in response to applied electric field (paragraph 36).

Response to Arguments

Applicant's arguments filed on 9/14/2010 have been fully considered but they are not persuasive. Applicant contends that Bertram fails to disclose that the organic material is chemically adsorbed to at least one part of the surface of the inorganic phosphor layer.

Examiner respectfully differs. Bertram discloses that the capping molecules are linked to the surface of the quantum dots. The linking is through chemical bonding between the quantum dot and the capping molecule (see paragraph 28). More over, please see US 2001/0040232, which clearly explained how the protective or capping molecules are attached through covalent bonding.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karabi Guharay whose telephone number is 571-272-2452. The examiner can normally be reached on Monday-Friday 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minh-Toan Ton can be reached on 571-272-2303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Karabi Guharay/
Primary Examiner, Art Unit 2889